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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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François Blaudin De The

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EXAMINER

BOYD, ERIN M

ART UNIT

PAPER NUMBER

4174

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/583,626	Applicant(s) BLAUDIN DE THE, FRANÇOIS	
	Examiner Erin M. Boyd	Art Unit 4174	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-10 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 6-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/20/06 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/20/06</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. Figures 1A and 1B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: On page 1, line 13-14 of the specification, "comprises" should be "comprise" and the phrase "that have an" should be changed to "that has an".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 3,804,710 (herein after "Bresnick"). Bresnick teaches a fuel rod for a nuclear reactor that is cooled by water, comprising a cylindrical tubular cladding 1; a column of nuclear fuel pellets 2 that are stacked one on top of another inside the tubular cladding 1 in the axial direction of the cladding; a first end plug 6 for tight closure of a first axial end of the cladding of the rod 1 arranged at a lower portion of the fuel rod when the rod is in an operating position inside the nuclear reactor, the cladding of the rod having an axis vertical (figure 1); and a second plug 7 for a tight closure of the second axial end of the cladding, the column of fuel pellets 2 resting on an inner portion of the first plug 6, referred to as a lower plug, via a first lower end, and being retained inside the tubular cladding 1 by a compression spring 5 that is interposed between a second upper axial end 4 of the column of fuel pellets 2 and an end of an inner portion of the second plug 7, referred to as the upper plug, wherein the inner portion of the lower plug 6 engaged inside the tubular cladding 1 successively comprises, in the axial direction and in a direction from the first towards the second end of the cladding, a first cylindrical portion 13 that has a diameter that is substantially equal to the inner diameter of the tubular cladding, a second cylindrical portion 16 that has a diameter that is smaller than the inner diameter of the tubular cladding and a third cylindrical portion 14 that has a diameter that is smaller than the inner diameter of the tubular cladding and that is greater than the diameter of the second cylindrical portion 16 so that there remains, between a lateral outer surface of the third cylindrical portion 14 and an inner surface of the tubular cladding 1, a radial clearance for passage of gas and a substantially planar end surface 15 on which the first end of the column of fuel pellets 2 rests, so

that an annular space for expansion of gas is formed between the outer surface of the second portion 16 of the inner portion of the lower plug 6 and the inner surface of the cladding 1 (figure 1 and 2, column 2, lines 16-60).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,804,710 (“Bresnick”), as applied to Claim 6, in view of U.S Patent No. 4,046,631 (herein after “Clapham”). Regarding Claim 7, Bresnick teaches the fuel rod wherein the third cylindrical portion 14 of the inner portion of the lower plug 6 of the fuel rod has a diameter such that there remains, between the outer lateral surface of the third cylindrical portion 14 and the inner surface of the tubular cladding 1, a radial clearance for assembly and passage of gas (figure 1). Bresnick fails to teach that the radial clearance is between one and two tenths of a millimeter, but Clapham teaches that the radial clearance between a third cylindrical portion 7 and the tubular cladding 1 is 1.8 mm (figure 1, column 3, lines 9-10). Although neither Bresnick nor Clapham disclose the specific values for the radial clearance claimed in Claim 7, one of ordinary skill in the art is expected to routinely experiment with the parameters, especially when the specifics are not disclosed, so as to ascertain the optimum or workable ranges for a particular

use. Accordingly, it would have been obvious through routine experimentation and optimization, for one of ordinary skill in the art to find that one to two tenths of a millimeter is an appropriate/sufficient radial clearance between the tubular cladding and third cylindrical portion; and hence, design the plug/fuel rod as such.

7. Regarding Claim 8, Bresnick teaches the basic inventive features, but fails to teach that the second cylindrical portion of the inner portion of the lower plug has a diameter of between 40% and 60% of the inner diameter of the tubular cladding and a length in the axial direction of between 8 and 10 times the inner diameter of the tubular cladding. Clapham teaches that the second cylindrical portion 6 of the inner portion of the lower plug 4 had a diameter of about 18% of the inner diameter of the tubular cladding (column 3, lines 10-11). Although neither Bresnick nor Clapham disclose the specific percentage that the diameter of the second cylindrical portion 6 is of the diameter of the tubular cladding 1, claimed in Claim 8, one of ordinary skill in the art is expected to routinely experiment with the parameters, especially when the specifics are not disclosed, so as to ascertain the optimum or workable ranges for a particular use. Accordingly, it would have been obvious through routine experimentation and optimization, for one of ordinary skill in the art, to find that designing the second cylindrical portion diameter between 40% and 60% of the diameter of the tubular cladding 1 is sufficient / appropriate. In addition, applicant discloses in the specification (page 13, line 25-33) that the intermediate portion (second cylindrical portion) may have any length in the axial direction which allows the end of the tubular cladding to be closed in a tight manner relative to the first cylindrical portion and the fuel

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pellet column; thus, the limitation that the length of the second cylindrical portion is 8 to 10 times the diameter of the tubular cladding is a matter of design and not critical to the invention.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,804,710 ("Bresnick"), as applied to Claim 6, in view of U.S. Patent No. 4,120,752 (herein after "Ocken"). Bresnick teaches the basic inventive features, but fails to teach that at least a portion of the fuel pellets of the column of fuel pellets comprises one of plutonium oxide and a mixed oxide of uranium and plutonium. Ocken teaches mixed oxide fuel pellets 10 of uranium and plutonium (figure 2; column 2, lines 63-66). The motivation for using mixed oxide (uranium and plutonium) as fuel in the fuel rod of a reactor is to provide the necessary heat energy for a coolant flowing past the fuel rod, yet the maintaining the structural integrity of said fuel rod (column 2, lines 28-34). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use mixed oxide (plutonium/uranium) fuel pellets as the fuel source in a nuclear reactor.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,804,710 ("Bresnick"), as applied to Claim 6, in view of U.S. Patent No. 4,111,748 (herein after "Hayashi et al."). Bresnick teaches the basic inventive features, but fails to teach that there is at least one cross-member in at least one zone of the second cylindrical portion, extending in an axial direction, the at least one cross-member constituted by a diametrically widened cylindrical portion of the second cylindrical portion that has an outer diameter that is substantially equal to the inner diameter of the tubular cladding that is reduced by an assembly clearance. Hayashi et

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al. teaches a lower end plug 5 / supporting structure 3e combination of a nuclear fuel rod that has a cross-member 6e in the zone of the second cylindrical portion 13, extending in the axial direction, the cross-member 6e constituted by a diametrically widened cylindrical portion of the second cylindrical portion 13 that has an outer diameter that is substantially equal to the inner diameter of the tubular cladding 2 that is reduced by an assembly clearance (figure 1 and 7b). A motivation for designing the end plug as described above is to allow the production of a series of successive breaks to thereby allow retention of relatively uniform distribution of stress in the cladding tube or at the plugged end junctures (column 2, line 64 – column 3, line 3). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to design the end plug to have at least one cross-member in at least one zone of the second cylindrical portion, extending in an axial direction and having an outer diameter that is substantially equal to the inner diameter of the tubular cladding that is reduced by an assembly clearance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin M. Boyd whose telephone number is (571) 270-5378. The examiner can normally be reached on Monday - Friday 8:00-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly D. Nguyen can be reached on (571) 272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/E. M. B./
Examiner, Art Unit 4174

/Kimberly D Nguyen/
Supervisory Patent Examiner, Art Unit 4174